

REMARKS

Claims 13 to 26 are now pending. Claims 15 and 22 have been canceled in the present application -- however, Applicant reserves the right to file a divisional application or other with respect to the subject matter of those claims. Claims 16, 17, 23 and 24 have been amended for clarification purposes. No new matter has been added. Above, any amendments to the claims are shown by underlining (additions) and strikeouts (deletions).

Applicants respectfully request reconsideration of the present application in view of this response.

Applicants thank the Examiner for stating that claims 16, 17, 23 and 24 would be allowable if rewritten in independent form including any features of the base claim and any intervening claims. Accordingly, Applicants have amended claims 16, 17, 23 and 24 above in accordance with the Examiner's comments. Applicants respectfully submit that claim 16, 17, 23 and 24 are in allowable form and any objections to those claims should be withdrawn.

Claims 15 and 22 were rejected under 35 U.S.C. § 112, first paragraph, as being unenabled due to the specified "FLC-388." Claims 15 and 22 have been canceled. Accordingly, Applicants respectfully request the withdrawal of any rejection of claims 15 and 22.

Claims 15 and 22 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite due to the specified "FLC-388." Claims 15 and 22 have been canceled. Accordingly, Applicants respectfully request the withdrawal of any rejection of claims 15 and 22.

Claims 13, 14, 15, 20, 21 and 22, were rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent No. 6,606,134 to Funfschilling ("Funfschilling reference") in view of U.S. Patent No. 5,293,261 to Shashidhar et al. ("Shashidhar reference").

The Funfschilling reference purportedly describes a reflective ferroelectric liquid crystal display which can be actuated without DC voltage and has a maximum switching angle of  $\pm 22.5$  degrees. Abstract. The Funfschilling reference further refers to the liquid crystal display as having a birefringent liquid crystal layer; in a first category of liquid crystal displays, the additional birefringement element is a transparent plate having an optical path difference  $\Delta n \cdot d \approx \lambda/4$ , which is arranged after the liquid crystal layer in the direction of the light incidence.

The Shashidhar reference purportedly describes a device for low electric-field induced switching of Langmuir-Blodgett ferroelectric liquid crystal polymer films, where the

Langmuir-Blodgett film of a liquid crystal polymer is disposed between electrodes on the surface of a substrate. Abstract. The Shashidhar reference states that the Langmuir-Blodgett films of the liquid crystal polymer exhibit pyroelectric properties even at thicknesses below 10-15  $\mu\text{m}$ . Abstract.

In contrast, claim 13 is directed to an optical liquid crystal modulator having at least one ferroelectric liquid crystal, wherein the at least one ferroelectric liquid crystal *has a DHF mode* and, at a location of the at least one ferroelectric liquid crystal, *exhibits an operating range of an electric field of more than 20 V/ $\mu\text{m}$* .

The Funfschilling and Shashidhar references, whether taken alone or in combination, teach or suggest all of the features of claim 13. The Office Action cites the Funfschilling reference at col. 4, lines 8-14 which recites “a conventional, transmitting DHF cell 201 having a ...layer 202..., which is arranged between two plates 203 and 204 of transparent material which are parallel to one another....” The Funfschilling reference apparently addresses using a DHF cell in its reflective ferroelectric LCD, the ferroelectric LCD having an optical axis which is electrooptically rotated, a polarizer, a pair of parallel plates enclosing the liquid crystal layer ... a light-reflecting mirror or diffuse reflector.... The Funfschilling reference does not teach or suggest that an optical liquid crystal modulator having a ferroelectric liquid crystal exhibits an operating range of an electric field of more than 20 V/ $\mu\text{m}$ . In fact, the Funfschilling reference does not appear to consider the operating range of the electric field at all.

The Shashidhar reference cannot cure the deficiencies of the Funfschilling reference. First, Applicants submit that the two references are not properly combinable since there is no express motivation for combining the two references: the Funfschilling reference appears directed to a reflective ferroelectric liquid crystal display with particular angles, avoiding possible hysteresis effects; and the Shashidhar reference appears directed to a low-electric-field inducements of Langmuir-Blodgett ferroelectric liquid crystal polymer films. Second, the Shashidhar reference does not teach or suggest all of the features of claim 13, including an optical liquid crystal modulator having at least one ferroelectric liquid crystal, wherein the at least one ferroelectric liquid crystal *has a DHF mode and, at a location of the at least one ferroelectric liquid crystal, exhibits an operating range of an electric field of more than 20 V/ $\mu\text{m}$* . The Office Action refers Applicants to col. 4, lines 51-63, refers to the electrodes, disposed on the substrate surface being capable of generating an electric field strength of 10(power 4) to 3x10(power 5) V/cm (i.e., 10 to 30 V/ $\mu\text{m}$ ). Thus, the Shashidhar reference teaches and suggests electric fields of less than 20 V/ $\mu\text{m}$  and does not appear to make any

particular distinctions or discoveries regarding the electric field -- in part, perhaps because the Shashidhar (and the Funfschilling reference) together don't include all of the other features of claim 13 of the present invention. The Shashidhar reference does not teach or suggest that the ferroelectric liquid crystal has a DHF mode and that at the location of the at least one ferroelectric liquid crystal exhibits an operating range of an electric field of more than 20 V/ $\mu$ m. Notwithstanding the Shashidhar reference's mention of 10 to 30 V/ $\mu$ m electric field strength of the electrodes and Funfschilling reference's mention of having a DHF cell, the references in combination (even though Applicants believe the references are not properly combinable) do not teach or suggest that a ferroelectric liquid crystal having a DHF mode exhibits an operating range of an electric field of more than 20 V/ $\mu$ m at a location of the at least one ferroelectric liquid crystal, as in claim 13.

Accordingly, Applicants respectfully request allowance of claim 13 and withdrawal of the rejection under 35 U.S.C. § 103(a). Claim 20 includes features analogous to claim 13 and is therefore allowable for essentially the same reasons as claim 13.

Claims 15 and 22 have been canceled. Claims 14 and 21 depend from one of claims 13 and 20 and are therefore allowable for at least the same reasons as claims 13 or 20.

Accordingly, Applicants submit that claims 13, 14, 20 and 21 are allowable, and withdrawal of all the rejections of claims 13, 14, 20 and 21, is respectfully requested.

Claims 18, 19, 25 and 26 were rejected under 35 U.S.C. § 103(a) as unpatentable over the Funfschilling reference in view of the Shashidhar reference and further in view of U.S. Patent No. 5,627,666 to Sharp et al. ("Sharp reference").

Claims 18, 19, 25 and 26 depend from one of claim 13 or claim 20 and are therefore allowable over the Funfschilling and Shashidhar references, alone or in combination, for at least the same reasons as claim 13 or 20.

The Sharp reference purportedly describes a liquid crystal phase modulator having an electro-optically rotatable smectic liquid crystal half-wave retarder in combination with a cholesteric liquid crystal circular polarizer, where rotation of the half-wave retarder varies the phase delay of the modulator. Title and Abstract. The Office Action cites col. 6, lines 10-32, which refers to a phase modulator using a BDH 764E cell, operated at room temperature, at which the maximum tilt angle is  $\pm$  12 degrees and the maximum rotation is 24 degrees. The reference itself does not appear combinable with either or both of the Funfschilling and Shashidhar references. Further, the Sharp reference does not appear to teach or suggest or even concern a ferroelectric liquid crystal having a DHF mode exhibiting an operating range of

an electric field of more than 20 V/ $\mu$ m at a location of the at least one ferroelectric liquid crystal, as in claim 13 or 20 (and thus claims 18, 19, 25 and 26). Accordingly, Applicants respectfully request allowance of claims 18, 19, 25 and 26 and withdrawal of the rejection under 35 U.S.C. § 103(a).

Moreover, to reject a claim as obvious under 35 U.S.C. § 103, the prior art must disclose or suggest each claim element and it must also provide a motivation or suggestion for combining the elements in the manner contemplated by the claim. (See Northern Telecom, Inc. v. Datapoint Corp., 908 F.2d 931, 934 (Fed. Cir. 1990), cert. denied, 111 S. Ct. 296 (1990); In re Bond, 910 F.2d 831, 834 (Fed. Cir. 1990)).

The Federal Circuit in the case of In re Kotzab has made plain that even if a claim concerns a “technologically simple concept” -- which is not even the case here, there still must be some finding as to the “specific understanding or principle within the knowledge of a skilled artisan” that would motivate a person having no knowledge of the claimed subject matter to “make the combination in the manner claimed”, stating that:

In this case, the Examiner and the Board fell into the hindsight trap. The idea of a single sensor controlling multiple valves, as opposed to multiple sensors controlling multiple valves, is a technologically simple concept. **With this simple concept in mind, the Patent and Trademark Office found prior art statements that in the abstract appeared to suggest the claimed limitation. But, there was no finding as to the specific understanding or principle within the knowledge of a skilled artisan that would have motivated one with no knowledge of Kotzab's invention to make the combination in the manner claimed.** In light of our holding of the absence of a motivation to combine the teachings in Evans, we conclude that the Board did not make out a proper *prima facie* case of obviousness in rejecting [the] claims . . . under 35 U.S.C. Section 103(a) over Evans.

(See In re Kotzab, 55 U.S.P.Q.2d 1313, 1318 (Federal Circuit 2000) (citations omitted, italics in original, emphasis added)). Here again, there have been no such findings.

*In addition*, with respect to the above-identified application, Applicants request some sort of evidence and/or affidavit from the Patent Office regarding the Patent Office's assertions of what it suggests is obvious to one of ordinary skill in the art.

No motivation or suggestion for combining the elements in the manner contemplated by claim 13 or claim 20 is shown in the Funfschilling, Shashidhar nor Sharp references, alone or in combination.

Accordingly, it is respectfully submitted that the rejection of claims 13, 14, 18, 19, 20, 21, 25 and 26 under 35 U.S.C. § 103(a) should be withdrawn.

CONCLUSION

In view of all of the above, it is believed that the objections to claims 16, 17, 23 and 24 have been obviated by Applicants' amendments above and the rejections of claims 13, 14, 18, 19, 20, 21, 25 and 26, under 35 U.S.C. § 103(a) have been obviated, and that all currently pending claims 13, 14, 16 to 21, and 23 to 26 are allowable. It is therefore respectfully requested that the objections and rejections be reconsidered and withdrawn, and that the present application issue as early as possible.

If it would further allowance of the present application, the Examiner is invited to contact the undersigned at the contact information shown below.

Respectfully submitted,

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